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RubberWorld

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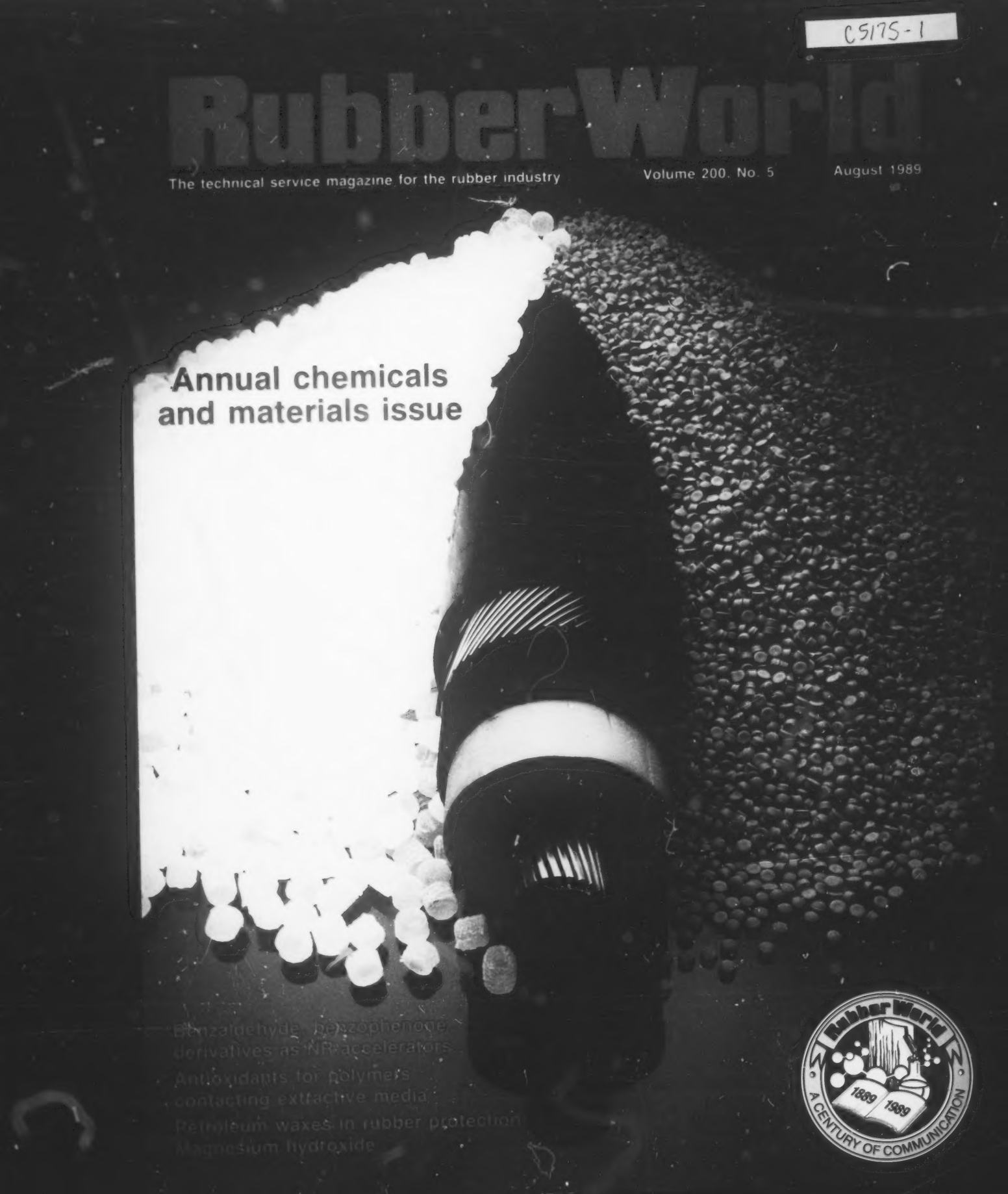
Volume 200. No. 5 August 1989



Annual chemicals and materials issue

Benzaldehyde, benzophenone derivatives as NR accelerators

Antioxidants for polymers contacting extractive media

Petroleum waxes in rubber protection

Magnesium hydroxide

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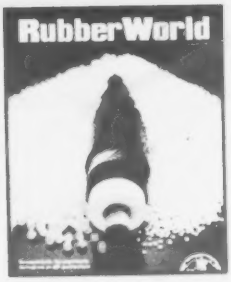
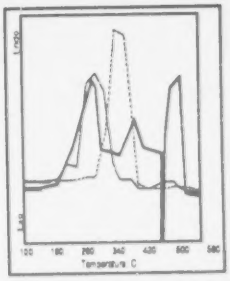


Chemicals & materials



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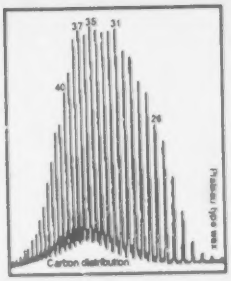

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5 Business Briefs
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8 Tech Service: On-stream oil purification lowers operating expenses
by Jon Menough, contributing technical service editor. This month's column reviews the importance of operating machinery only with clean oil.

12 Patent News
edited by Bob Samples, Akron Rubber Development.

13 Persistent antioxidants for polymers contacting extractive media
by Donald E. Miller, Michael M. Gozdiff, Frank G. Shaheen and Paul R. Dean II, Goodyear. The authors compare various non-volatile, reasonably non-extractable commercial materials in NBR and CR.

24 Evaluation of benzaldehyde and benzophenone derivatives as accelerators in NR
by A.A. Yehia, N.L. Doss, National Research Centre, Dokki, Cairo, Egypt, and M.N. Ismail, Military Academy - Heliopolis, Cairo, Egypt. In this study, some organic compounds of the type "aldehyde, ketone-amine condensation products" were synthesized and investigated in NR mixes as accelerators.

30 Magnesium hydroxide: A new and versatile rubber chemical
by Mildred A. Hastbacka, Morton Thiokol, Ventron Division. The magnesium hydroxides studied and recommended as rubber chemicals in references presented in this article are precipitated reaction products.

36 The role of petroleum waxes in the protection of rubber
by F. Jowett, Astor Chemical. This article illustrates how knowledge of the composition of petroleum waxes, and the influence of temperature on their activity, allows rubber waxes to be blended from suitable petroleum raw materials to give products offering maximum protection over a wide temperature range and with optimum cost-effectiveness.

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Cover photo courtesy of Du Pont.

A Lippincott & Peto Publication

Editorial

The news that the Society of the Plastics Industry was establishing an automotive market council came as no real surprise. The SPI has always been active in promoting member companies in markets they serve. What is surprising is that there is no similar type of group in the elastomer area. Whereas transportation accounts for around 70% of all elastomers consumed, it is a much smaller market to the plastics industry in terms of percentage. You would think the rubber industry, with its ties to the automotive industry from the inception of the horseless carriage and its heavy dependence on that industry, would already have a council in place.

It's not that the SPI has some radical new idea. The council's mission is to enhance the relationship of the plastics industry with the automotive industry and to create an ongoing and mutually beneficial partnership between the two industries. They plan to:

- provide a means of communications among producers, suppliers and end-users of plastics in the automotive market
- provide a forum for the automotive industry to interact with the plastics industry on current and future needs for parts and materials
- prepare and disseminate educational and promotional material highlighting the qualities and characteristics of plastics as they relate to use in automotive applications
- address the impact of increased use of plastics in automotive applications on health, safety and the environment.

Why doesn't rubber have a similar council with similar aims? This type of group probably falls outside the scope of the Rubber Division, but maybe not the RMA. It might make a perfect subdivision of the Rubber Division, along with the Energy Rubber Group and the Thermoplastic Elastomers Group.

The SPI realizes that the automotive industry is wide open for material replacement and is making sure that design engineers are aware of what plastics have to offer. The makers of rubber parts pretty much go it alone in Detroit and would definitely benefit from a collective effort. After all, many of the major rubber parts manufacturers belong to the SPI, as do the material suppliers. They don't belong to an automotive rubber council because there is no such vehicle.

Don R. Smith
Editor

RubberWorld

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- Product News
- Automotive Polymers & Design
- Blue Book: Materials, Compounding Ingredients, and Machinery for Rubber

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Business Briefs

plant goes on line. Production at the Ireland facility began in June.

Cyclonaire of York, NB substantially upgraded its customer materials testing facility, adding the capability to operate both dilute and dense phase systems, enhanced computerized instrumentation incorporating transducers for data acquisition and the ability to test pumping capabilities for distances in excess of 1,000 feet. Substantial tooling has been added; spare parts storage has been doubled in size; and the electrical and mechanical design engineering departments have been expanded with CAD facilities and state-of-the-art equipment. The company's headquarters, which moved from Henderson to York, will occupy offices with increased space of 30,000 square feet.

Electroserve merged with **Ceast USA**. The company will operate as Ceast USA and will supply rheological, electrical and chemical testing equipment to the North American market.

Elastomer Engineering Inc. (EEI) expanded its Sioux City, IA nylon RIM processing facility with the addition of a Battenfield SHN-65 RIM machine and a full tilting OMS Impianti press with 48" x 40" platens.

Kern Foam Products relocated its headquarters to a 40,000 sq. ft. production facility in South Plainfield, NJ, to produce specialty molded urethane foam products.

Bekaert will build a $28 million (U.S.), 42,000 metric-ton state-of-the-art steel wire manufacturing facility in Shelbyville, KY. Production will consist of low carbon specialty wire to serve preformed staple manufacturers in North America.

RMA tire report - April
(figures in thousands of units)

Passenger tires	YTD '89	YTD '88	% change
Shipments			
original equipment	19,097	18,135	5.3
radial	16,675	15,433	8.0
replacement	46,631	46,109	1.1
radial	44,117	42,964	2.7
export	4,511	3,426	31.7
radial	4,163	2,978	39.8
total	70,240	67,670	3.8
radial	64,954	61,375	5.8
Production	62,255	59,769	4.2
radial	57,792	53,931	7.2
Truck & bus tires			
Shipments			
original equipment	3,075	3,008	2.2
radial	2,538	2,209	14.9
replacement	11,061	10,437	6.0
radial	6,308	6,021	4.8
export	1,243	1,160	7.2
radial	940	911	3.1
total	15,379	14,606	5.3
radial	9,786	9,140	7.1
Production	13,686	12,549	9.1
radial	8,929	7,584	17.7

ESAB AB of Goteborg, Sweden, a producer of welding and cutting products, has reached an agreement to acquire the **L-TEC Group** located in Florence, SC, which manufactures and sells welding and cutting products in the U.S., Canada and Western Europe. L-TEC's trademark, products and distribution channels will be retained and developed.

ESAB Automation will construct a 100,000 square foot office and manufacturing complex in the Loveland/Fort Collins, CO area. The design will allow for a 100,000 square foot expansion in the future. ESAB Automation employs 300 and manufactures and sells automation products.

The **West Company** will construct a 40,000 square foot manufacturing facility in Lititz, PA, for the custom and specialty services unit of the company's Health Care Group, expanding total number of employees to 45. Completion is targeted for 1990.

Dow Chemical relocated its Detroit-based personnel and Automotive Materials Group into expanded facilities. The 28,000 square foot Detroit Dow Center nearly doubles the company's previous square footage and consolidates its automotive-oriented operations and personnel under one roof.

Electronic and Industrial Enterprises purchased a majority share of the joint venture, **Graham Japan Ltd.**, from partner **Carlisle Companies**. The sale includes the execution of a distribution agreement between the new owner and Carlisle's **Memory Products Group**, allowing the continued participation in the Japanese market by the Memory Products Group without the investment.

BFGoodrich Aerospace Division and **Phelps Engineering Plastics** (PEP) have signed a letter of intent for the acquisition of BFGoodrich's Marine Products and Services business unit by PEP for undisclosed terms. The transaction is subject to review by appropriate government agencies and the BFG board of directors, and to the execution of a definitive purchase agreement. Marine Products produces reinforced rubber sonar domes for ships at facilities in Jacksonville, FL.

Contracts, licenses

Freudenberg & Company of Weinheim, West Germany and **NOK Corp.** of Tokyo, Japan, formed **Freudenberg-NOK General Partnership**, which began operations in North America to design and manufacture seals, molded products and vibration control systems. The company operates 24 facilities in North America.

The **Dodge Cork Co.** of Lancaster, PA and **Berleburger Schaumstoffwerk GMBH** of Bad Berleburg, West Germany have formed a joint venture company, **Dodge-Regupol, Inc.**, based in Lancaster, for the manufacture and distribution of a variety of cork, cork/rubber and rubber products. The joint venture company plans to build 90,000 square feet of new facilities.

Business Briefs

The **Automotive Parts & Accessories Assoc.** and **Audits & Surveys, Inc.** have jointly developed the Aftermarket Sales Index (ASI), a research service to assist industry manufacturers in tracking sales of aftermarket products through a base of 2,300 automotive aftermarket chain stores. ASI will be available in January of 1990.

Truflex Rubber Products Company/Pang Rubber Co. of Los Angeles, CA was named sole supplier in the United States and Canada of Goodyear authorized repair materials.

Astor Wax of Harrison, NY, named **G.E. Chaplin** of Flemington, NJ, sales agent for its line of powdered waxes, servicing accounts in Virginia, Maryland, Delaware, New Jersey and Philadelphia, PA. **Washburn-Linder**, Framingham, MA was named sales agent for accounts in New England for Astor Wax.

Carter Baker Enterprises Ltd. of Marshbrook, Shropshire, England appointed **Techema BV** of Rijswijk, Netherlands as agents for its materials testing equipment for the Netherlands, Belgium and Saudi Arabia.

Corporate, financial news

Air Products and Chemicals increased prices of tin-based polyurethane catalysts, effective August 1. Dabco T-9 increased .50¢/lb.; Dabco T-10 increased .25¢/lb.; Dabco T-95 increased .16¢/lb.; and Dabco T-12 increased .35¢/lb.

ASTM's Institute for Standards Research has launched its first project. Submitted by ASTM Committee E-5 on fire standards, the project involves a major international interlaboratory testing program to validate two established and three proposed ASTM fire test methods. **Technical Committee 92** on fire standards will participate in the round robins for the three proposed test methods. Total financial commitment for the project is $1,590,000, of which 95 percent represents the labor and associated costs of the laboratories performing the tests. ISR will raise the remaining $86,000, which will be devoted to the extensive sample preparation and distribution prior to the laboratory tests.

Cabot reported income of $28.1 million and net sales of $540.9 million for the second quarter.

Eagle-Picher reported net income for the second quarter of $13.0 million on sales of $193.1 million.

Goodyear earned a net income of $27.1 million on sales of $2.8 billion for the second quarter. For the first six months of the year, net income was $121.6 million and sales were $5.5 billion.

Mobay achieved net sales of slightly over $2 billion in 1988, and net income of $113.4 million.

Polysar Performance Plastics' Clear Plastics Group renamed the company's clear acrylic copolymer and terpolymer products, dividing them into two groups. Acrylic styrene copolymers are now NAS 10-55 and impact grade acrylic terpolymers are now Zylar 90-92. There are no name changes for P210-D; R-510 resins; and LSC-50 light stable concentrate.

Rockwell International recorded net income of $207.7 million and sales of $3.16 billion for 1989's second quarter.

Rubbermaid reported sales of $334 million and earnings of $28.2 million for the second quarter of 1989. For the first six months of 1989, sales were $683 million and earnings were $57.5 million.

SABIC Marketing Europe is now a wholly-owned affiliate of **SABIC Marketing Ltd.** It will handle all sales of, and customer service for SABIC products in Europe.

UCB Group recorded net sales of BF34.9 billion and profits after tax of 1.4 billion for 1988.

RMA rubber report through March (figures in metric tons)

	YTD 1989	YTD 1988	% chg.
Total new rubber			
New rubber available	928,615	883,989	5.1
Imports	341,324	316,710	7.8
Exports	96,857	141,679	-31.7
Apparent consumption	800,915	750,900	6.7
Total natural rubber			
Imports	255,783	239,821	6.7
Exports	10,129	10,363	-2.3
Apparent consumption	229,679	238,752	-3.8
Total synthetic rubber			
Production	587,291	567,279	3.5
Imports	85,541	76,889	11.2
Exports	86,728	131,316	-34.0
Apparent consumption	571,237	512,148	11.5
Total SBR			
Production	223,050	226,114	-1.4
Imports	27,670	22,904	20.8
Exports	18,131	47,044	-61.5
Apparent consumption	224,949	194,221	15.8
Total nitrile			
Production	19,055	18,493	3.0
Imports	2,702	4,300	-37.2
Exports	5,331	4,185	27.4
Apparent consumption	15,644	19,408	-19.4
Polybutadiene			
Production	106,233	98,248	8.1
Imports	19,940	20,167	-1.1
Exports	22,261	18,832	18.2
Apparent consumption	98,137	99,958	-1.8
Ethylene-propylene			
Production	65,017	64,491	.8
Imports	6,031	1,730	254.4
Exports	10,707	14,799	-27.6
Apparent consumption	59,639	54,893	8.6
Butyl, polychloroprene, polyisoprene, silicone and other synthetic elastomers			
Production	173,935	159,932	8.8
Imports	29,098	27,788	4.7
Exports	30,296	46,456	-34.8
Apparent consumption	172,867	143,667	20.3

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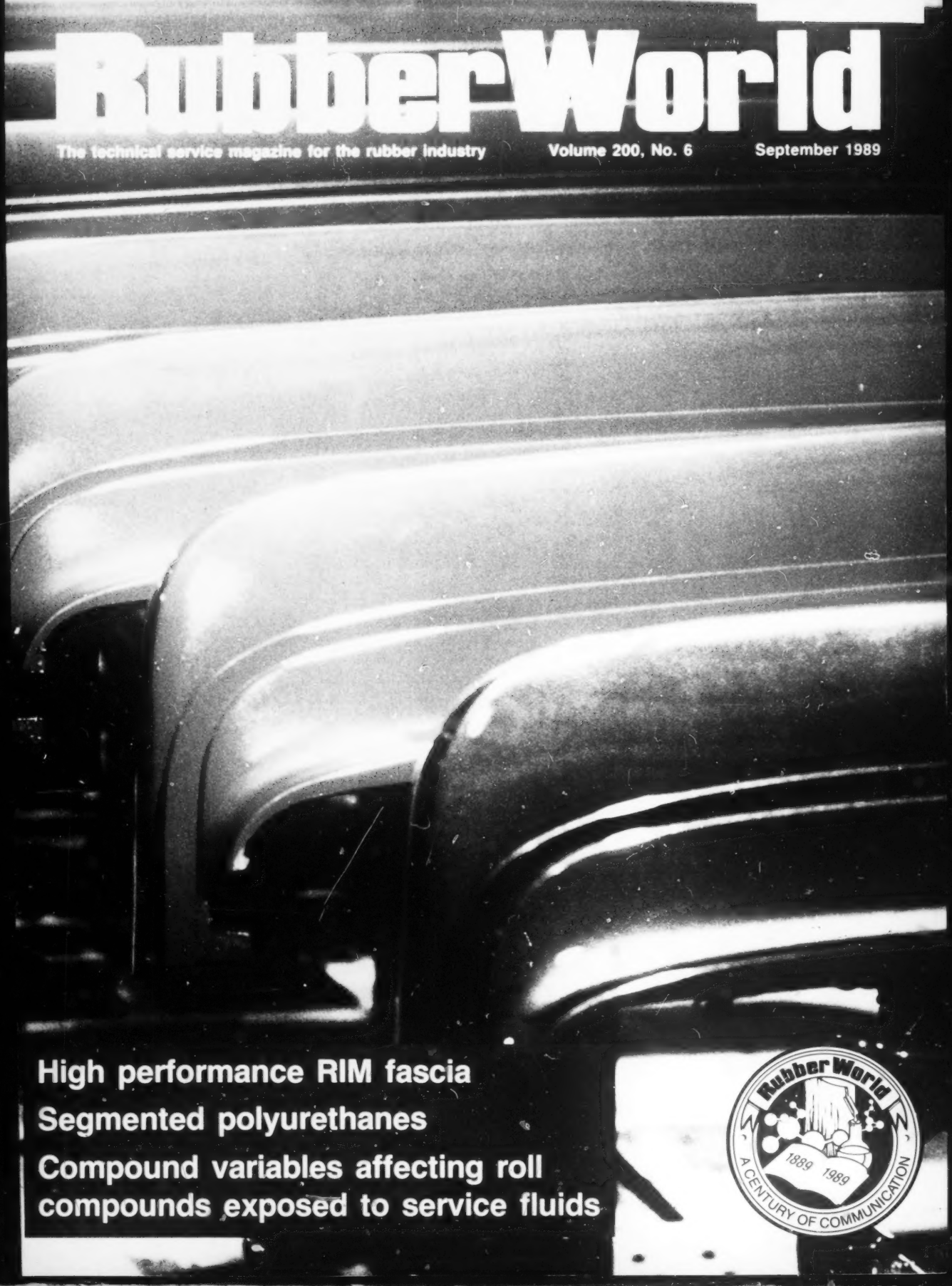

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Segmented polyurethanes

Compound variables affecting roll compounds exposed to service fluids

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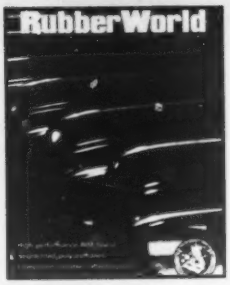

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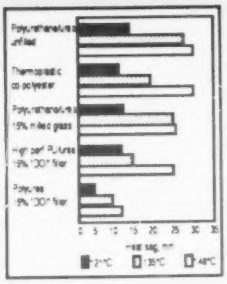

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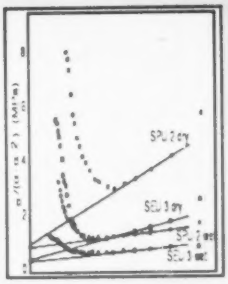

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21 Segmented polyurethanes based on triblock copolyether as biomedical materials
by Yuko Ikeda, Shinzo Kohjiya and Shinzo Yamashita, Kyoto Institute of Technology, Japan. Introduction of hydrophilic PEO units was found to lessen tendancy for blood-clotting, improve biocompatability, yet retain excellent mechanical properties.

28 Compound variables affecting roll compounds exposed to service fluids
by Gerald Thompson and Steve Strawn, Copolymer Rubber and Chemical Corp. Through a minimal amount of experimentation, the major factors causing undesirable volume swell, shrinkage and weight change in printing rolls have been determined.

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Cover photo courtesy of Dow Automotive Materials Group.

A Lippincott & Peto Publication

The Audit Bureau

Editorial

Education is a hot topic, especially in the urethane industry. But their interest in education goes beyond the traditional school curriculum. They're concerned with educating the American public in general, and specifically their elected officials. The urethane industry has been under siege for quite some time. Shortly after recovering from the MOCA issue along came the link between the use of chlorofluorocarbons and ozone depletion. And as the industry is discovering, other maladies are being laid on their doorstep.

So the industry is banding together through its organizations to go on the offensive - to educate. A letter writing campaign is underway hoping to sway Congress from passing legislation that could severely retard the industry. The Senate, House and the President all are proposing legislation to ease ozone depletion. The bills in Congress call for various regulatory fees and taxes while the Administration is leaning towards an auction of production rights for CFCs or a surcharge for CFC users. All of the proposed legislation would inflict harm on the urethane industry, beyond what the recently approved Montreal Protocol will do. Those manufacturers that use CFCs are urged to write Congress and the President to inform them how the legislation affects your business and to provide examples of environmentally beneficial uses of your product.

Not only do the elected officials have to be educated, but educators have to be educated as well. The Polyurethane Foam Contractors Division of the SPI found this out recently as sprayed polyurethane foam was blamed for illnesses at schools in New York and New Mexico. PFCD staff director George Sievert said further investigation proved that the real culprit was inadequate ventilation, but the sprayed foam industry was unjustly victimized by the news reports containing incorrect information. To hopefully stop the industry from being tarnished in this way again, Sievert has authored an article that ran in *American School & University* magazine detailing the whys of indoor air pollution. He hopes that school administrators, once educated, won't accuse spray foam without evidence, causing a loss of credibility to both the industry and the administrators.

Hopefully these measures will educate other industries to take action before credibility becomes a problem.

Don R. Smith
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RubberWorld

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available. Equipment purchases include two seismic reaction masses with 20 x 30 foot bedplates. A central control room for monitoring and controlling tests will be created, and a microprocessor-based controller will be installed.

Arco Chemical began construction on a facility to manufacture conventional and polymer polyols in Fos-sur-Mer, France. The facility will be adjacent to an existing 330 mm lbs./yr. propylene oxide and 790 mm lbs./yr. tertiary butyl alcohol unit, and will have an approximate capacity of 220 mm lbs./yr. The company will also increase PO capacity in Fos-sur-Mer by approximately 110 mm lbs./yr and increase methyl tertiary butyl ether output by approximately 3,000 bbls./day, with start-up targeted for the third quarter of 1990.

DSM Resins U.S. is expanding its production capacity for saturated polyester powder coating resins in Augusta, GA. Phase one, which was recently completed, increased production capacity by 40 percent. Phase two includes the installation of an additional reactor to be operational in 1990. The company is also building a new plant for printing ink resins at the Georgia location. The 10 million lbs./yr. plant is scheduled to come on stream in 1990.

Uniroyal Plastics formed an **Elastomeric Products Division** to concentrate on the custom rubber mixing, specialty calendering, commercial roofing and heavy extrusion markets.

Mobay formed an **Automotive Business Group** to be headquartered in Troy, MI at the company's Automotive Technical Marketing Center. The group will be the focal point for marketing and technical support for all automotive applications of Mobay products.

Ciba-Geigy acquired the epoxy syntactic potting compound aerospace product line of **Products Research & Chemical Corp.**, which will be marketed and sold by the **Furane Aerospace Products** group of Ciba-Geigy.

Hanson Industries' SCM Chemicals unit will increase annual production capacity of titanium dioxide by 58,000 tons, bringing the total to 107,000 tons, at its Ashtabula plant I, in Ohio, at an anticipated cost of $67.5 million. The project includes construction of a second production line and minor changes made to the existing equipment to integrate the two lines. Start-up is set for early 1991.

American Cyanamid will transfer its vulcanized vegetable oils manufacturing operations from Stamford, CT, to its facility in Marietta, OH. The technical staff at Marietta will expand the statistical process control program to include this product line. Marietta is currently being installed with new, up-to-date processing equipment.

RMA tire report - May
(figures in thousands of units)

Passenger tires	YTD '89	YTD '88	% change
Shipments			
original equipment	24,095	23,332	3.3
radial	21,019	19,848	5.9
replacement	59,577	58,972	1.0
radial	56,348	54,947	2.6
export	5,528	4,121	34.1
radial	5,115	3,599	42.1
total	89,200	86,425	3.2
radial	82,482	78,394	5.2
Production	78,031	74,207	5.2
radial	72,553	67,017	8.3
Truck & bus tires			
Shipments			
original equipment	3,884	3,822	1.6
radial	3,213	2,806	14.5
replacement	14,011	13,134	6.7
radial	8,019	7,597	5.6
export	1,546	1,435	7.7
radial	1,160	1,122	3.4
total	19,441	18,391	5.7
radial	12,391	11,525	7.5
Production	16,999	15,514	9.6
radial	11,136	9,411	18.3

Contracts, licenses

Mobay and **First Chemical Corp.** will cooperate on a 250 million lb./yr. aniline plant at Mobay's Baytown, TX, facility. The plant will include nitric acid and nitrobenzene as precursor units. First Chemical will act as general contractor for plant construction and will market all aniline not consumed by Mobay, which will be the owner/operater of the plant, that is expected to be completed in the first half of 1992.

Dow Corning and **Mono-Chem** will work together to formulate and market improved release and lubricant products. Dow will share its silicone technologies with Mono-Chem, which will formulate and market products needed by tire-making plants. Most of the products will be sold under the Mono-Chem name. Dow will continue with direct sales of existing products.

Polymer researchers at **The University of Akron**, Akron, OH, and **Akron Polymer Container Corp.** participated in a joint research venture to create the "Akro," a non-aerosol container. The effort was funded by a $220,000 industrial development loan from Ohio's Thomas Edison Program. Domestic production and distribution of the Akro will be centered in Akron, and its developer, **Robert Winer**, president of Akron Polymer Container, plans to begin licensing the technology of the patented container before the end of the year.

A mutual assistance and cooperation agreement was made between **Hillsdale Tool and Manufacturing**, Hillsdale, MI, and **Fuji Kiko Co., Ltd.**, Tokyo, Japan, for joint development of specific automotive components for the international market.

Dunlop-Enerka and **Akzo**, both Dutch firms, have conducted a program of research into the dynamic behavior of